Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (COMPUTER AND COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL/MAY 2017

SUBJECT: EMBEDDED SYSTEM DESIGN [ICT 2253]

REVISED CREDIT SYSTEM
26/04/2017

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:
- Answer **ALL** questions.
- Missing data, if any, may be suitably assumed.

1A.	Explain the following ARM instructions with an example for each: i) MSR ii) ASRS iii) CMN iv) BLS v) SMULL	5
1B.	Write an embedded C program to transfer the message "MIT One Team One Dream" serially on TxD0 (P0.2 , function 2), at 9600 baud. Assume 1-start bit, 1- stop bit and 8-bit data (PCLK=3 MHz)	3
1C.	Differentiate between i) Circuit clock and Peripheral clock ii) Timer and Counter	2
2A.	Assume that a switch is connected to EINT0 (P2.10, function-01) input. Write an embedded C program using interrupts to display the number of times the switch is pressed every 10 seconds on a seven-segment display.	5
2B.	Define "Resolution of a DAC". Explain the role of DAC Control and Counter Value registers in double buffering.	3
2C.	Given PCLK=3 MHz and PR=0. Determine the value to be loaded in MR0 to get a square waveform of frequency 10 Hz on MAT 0.0.	2
3A.	Write an assembly language program to sort an array of 10 signed 32-bit binary numbers present in the code memory using bubble sort and store the result in the data memory.	5
3B.	Explain the necessity of the following registers in handling the BURST mode of ADC: i) A/D Control Register ii) A/D Global Data Register iii) A/D Interrupt Enable Register	3
3C.	Differentiate between i) Memory mapped IO and IO mapped IO. ii) Microcontroller and microprocessor	2

4A.	What is "Pulse Width Modulation"? With a neat diagram, explain the Pulse Width Modulation module of ARM microcontroller.	5

4B.	Explain the following addressing modes of ARM microcontroller.
	    i) Post Indexed
	    ii) Pre Indexed
	    iii) Pre Indexed with Writeback
		3

4C.	It is required to find the difference in analog voltages applied at ADC channel-0 and channel-1. Explain how this task can be accomplished using SOFTWARE mode of ADC.	2
5A.	Assume that columns of a 3x3 matrix keyboard are connected to P0.0-P0.2 and rows are connected to P2.0-P2.2, write an embedded C program using keyboard interrupt to display the key code of the key pressed on a seven segment display.	5
5B.	What do you mean by "fully descending stack"? Explain the role of STMDB and LDM instructions in implementing a fully descending stack with an appropriate example.	3
5C.	What is "Function Mode Set" command in LCD? Explain its significance in LCD configuration.	2